

*EFFECTS OF POSTING SELF-SET GOALS ON
COLLEGIATE FOOTBALL PLAYERS' SKILL EXECUTION
DURING PRACTICE AND GAMES*

PHILLIP WARD

THE OHIO STATE UNIVERSITY

AND

MICHAEL CARNES

KUTZTOWN UNIVERSITY OF PENNSYLVANIA

The effects of self-set goals and public posting on athletic performance of 5 collegiate football players was studied. All players were linebackers on a National Association of Intercollegiate Athletics Division II football team. The dependent variables were the percentage of correct occasions when the linebacker (a) positioned himself to cover a specified area on the field during a pass or from the line of scrimmage during a run; (b) moved to the correct position in response to the positioning of the offense; and (c) tackled and stopped the progress of the ball carrier. A multiple baseline design across behaviors showed an immediate increase in the practice performance of the players and a corresponding increase in game performance following introduction of the independent variable. This study extends research using public posting in sport by demonstrating the effects of player-determined goals and public posting of goal attainment.

DESCRIPTORS: public posting, goal setting, athletic performance, football

Research in sports psychology has relied heavily on laboratory studies, the results of which have not always produced improved performances for athletes in competitive situations (Locke & Latham, 1985; Weinberg, Burton, Yukelson, & Weigand, 2000). This has promoted calls for athletes' performances to be studied in competitive environments over the course of a complete season (Green-span & Feltz, 1989; Swain & Jones, 1995). Such calls have been accompanied by recommendations for the use of single-subject designs as the method of choice in assessing the effects of interventions in sport settings because of the sensitivity of these designs in tracking individual variability (Bryan, 1987; Shambrook & Bull, 1996; Swain & Jones, 1995).

There is a long history of effective behav-

ioral interventions in sport settings that began in the late 1960s (see Donahue, Gillis, & King, 1980; Lee, 1993; Martin, 1992). Lee has suggested that although there have been excellent examples of behavioral interventions in sport, the work has been conducted with little systematic replication, and few studies have assessed long-term effects. One exception to these criticisms has been research on public posting (Nordstrom, Lorenzi, & Hall, 1991; Van Houten, 1980). Public posting has demonstrated robust effects across diverse populations (e.g., children through adults), a variety of settings (e.g., schools, senior centers, and public roads), and a broad range of behaviors (e.g., academic and sports skills, monetary donations, shoplifting, and driving).

Most studies in sports using public posting have provided feedback on performance without describing response consequences as an explicit component of the intervention. Researchers have demonstrated the effects of

Address correspondence to Phillip Ward, The Ohio State University, Sport and Exercise Education, 309 Pomerene Hall, 1760 Neil Ave., Columbus, Ohio 43210-1221 (e-mail: ward.116@osu.edu).

public posting on (a) fair play and skill execution during basketball practices by high school students (Siedentop, 1980), (b) skill execution during practices and games by wide receivers on a collegiate football team (Ward, Smith, & Sharpe, 1997), and (c) breaches of etiquette by collegiate players during tennis matches (Galvan & Ward, 1998). Two studies have reported the effectiveness of public posting combined with self-recording on the laps swum by members of youth swimming teams (Critchfield & Vargas, 1991; McKenzie & Rushall, 1974).

It has been suggested that tying performances explicitly to consequences can facilitate changes in responding (Van Houten, 1980). However, few studies in sport settings have made this linkage. Hume, Martin, Gonzalez, Cracken, and Genthon (1985) used coach feedback for correct self-recording of skill execution by figure skaters, and Ward, Johnson, Ward, and Jones (1997) used a point system tied to correct performances of shallow-water rescues by lifeguards.

The purpose of this experiment was to extend the research on public posting in sport settings by assessing whether or not football players met self-set goals. This study differs from previous research in three ways. First, the determination of the goal was decided by each player rather than the coaches or researchers. Second, a player's goal was known only to the researchers and the player. Third, instead of posting the performance level next to the player's name on a performance chart, a Y indicating the player had met his goal or an N indicating that the player had not met his goal for the day was publicly posted.

METHOD

Participants and Setting

The participants were 5 linebackers of a National Association of Intercollegiate Ath-

letics (NAIA) Division II football team located at a 4-year liberal arts college in the Midwest. The athletes ranged in age from 19 to 21 years ($M = 20$) and had played collegiate football for at least 2 years. The linebackers' coach selected 5 players whom he rated as consistently demonstrating poor execution of target skills during practice and game play based on the previous year's statistics, but who were likely "starters" for the coming season. The study was conducted over an entire season. Practice sessions were held 3 days per week for 2 hr per day. During that time approximately 35 min were spent on the drills analyzed in this study. The practice sessions were conducted on the college football fields. Games against other NAIA II teams were held weekly after the 3rd week of the season and were held both on and off campus.

Dependent Variables and Data Collection

Three dependent variables were used in this study. First, the percentage of correct "reads" was used to measure whether or not the linebacker positioned himself to cover a specified area on the field during a pass or from the line of scrimmage during a run. Second, the percentage of correct "drops" was used to measure whether or not the linebacker moved to the correct position described in the play book in response to the positioning of the offense. Third, the percentage of correct tackles was used to measure whether or not the linebacker tackled the ball carrier and stopped his progress.

During practice sessions and games, the first 10 trials of each skill were recorded. We choose to limit the trials to 10 because (a) high variability in the number of performance opportunities occurred across practices and games, and (b) not all linebackers who participated in this study played a full game, and thus they received an unequal number of performance opportunities.

Data were collected during practice ses-

sions by videotape and were coded later the same day. During practices, the videocamera was located 1 m above the ground, behind the line of scrimmage. During games, the camera was located in the press box, which was typically 15 to 30 m above the ground (depending on the venue). The presence of a videocamera at practices and games was common for the team. Each read, drop, or tackle was coded as either correct or incorrect, and the number correct trials for each drill was converted to a percentage. A correct read or drop occurred if the linebacker moved to the correct zone relative to predefined pass coverage described in the coaches' play book. Tackles were correct if the offensive ball carrier was stopped.

Data were collected by two coaches who were part of the team but who were not coaching the linebackers. These observers were not informed of the purpose of the study, the goals the players set, or the sequence of the interventions. Prior to the start of the study, the observers completed one training session in which they matched definitions of correct and incorrect reads, drops, and tackles with descriptions of plays and coded the dependent measures from a previous season's game videotape. The videotape had previously been coded to establish an accuracy benchmark against which to compare the observers' responses. A criterion of 95% agreement was established between the benchmark data and the observers' responses before they scored the videotapes in the current study.

Experimental Design and Intervention

A multiple baseline design across reads, drops, and tackles was used to assess the effects of the intervention. During baseline, the players met with the coach and reviewed expectations for each drill and then proceeded to practice. While practicing, players received feedback and error correction of their

performance from the coach just as the other players did.

The intervention consisted of two parts. First, following baseline each player met with a researcher who described his mean baseline performance for a specific skill. Separate goals were set for reads, drops, and tackles. Players were not aware of what behaviors were targeted for change until the 1st day of each intervention. Players were asked to set goals that were higher than their mean performance during practices. No goals were established for game performances. Players' correct performances during baseline ranged from 60% to 80%. All chose a goal of 90% correct performance. The investigators were aware of this goal, but the coaches and other players were not.

Second, players were informed that the results of each day's practice would be posted on a daily performance chart prior to the next practice session. If a player met his goal, a Y (i.e., yes) was placed next to his name on the performance chart; if a player did not meet his goal an N (i.e., no) was placed next to his name. Only the skills currently being targeted were shown on the performance chart. The chart was placed on the wall of the locker room beside the door that led to the field where all players on the team could see the results. The head coach explained to the other players on the team the purpose of the chart. Players' data were posted on the daily performance chart for practice performances but not for game performances. Thus, the game data provide a measure of the generality of the effects of the intervention from practice to game settings. Although public posting had been used with other team members the year before, none of the participants in this study had been involved.

Interobserver Agreement

Interobserver agreement data were collected by having a third observer record correct

and incorrect performances of each skill from the videotapes of practices and games, on a trial-by-trial basis concurrent with but independent of the primary data collectors. Agreement was assessed on 45% of the practice sessions and 44% of the games distributed equally among players and conditions. Agreement was computed by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100%. Mean agreement for reads was 92% (range, 90% to 94%), for drops it was 92% (range, 90% to 93%), and for tackles it was 93% (range, 93% to 94%).

RESULTS

Results are shown in Figures 1 through 5 for each of the participants (John, Brad, Dave, Chuck, and Jack). The data show similar baselines and intervention effects across skills and players. Baselines for the participants were relatively stable, ranging from 60% to 80% correct performances during practices. Following intervention, the skills increased to 90% to 100%. There were four occasions on which the players did not meet their goals: reads by Chuck (Day 17) and reads by Dave, Chuck, and Jack (Day 20). Day 20 was a session conducted during a rainstorm. The generalization data in the game settings for reads, drops, and tackles show a pattern similar to practice data.

DISCUSSION

The public posting intervention used in this study was effective in improving the correct performance of reads, drops, and tackles during practice sessions. During baseline, all of the target players failed to achieve greater than 80% correct performance on reads, drops, and tackles during practice and showed similar performances during games. During the intervention, the players established and met goals that equaled or exceed-

ed 90% correct performance. The improvement in practice performances also generalized to game settings.

Collectively, the findings of this study and that of Ward, Smith, and Sharpe (1997) suggest that if players improve their performance in practice, they will perform better in games. This finding lends credence to the aphorism that "you play as you practice." Moreover, the finding that the game play alone is not enough to improve performances is similar to that reported by Ward, Johnson, Ward, and Jones (1997), who concluded that the consequences of incorrectly executing a water rescue were not enough to produce competent practice in trained lifeguards. These conclusions suggest that sports psychologists and coaches should look to performance contingencies to improve the skills of athletes rather than relying on "train and hope" strategies, unidentifiable variables, or finding athletes who are "strongly motivated."

Unlike previous public posting studies in sports settings, no information was posted relative to the level of performance of each player; instead, a yes or no was posted to indicate that players had either achieved or not achieved their personal performance goals. The baseline levels of performance in this study were similar to those reported by Ward, Smith, and Sharpe (1997), who allowed coaches to set player goals. Comparing the two studies, there seems to be little difference between the level of performance set by the coaches in the earlier study and the goals set by the players in the current analysis.

At least two considerations are relevant in the extrapolation of these data to other situations. First, the players in this study had stable baselines that were quite high. One would expect a high level of skill execution from collegiate athletes. However, it is not known if the intervention would have had similar effects on less skilled performers. Sec-

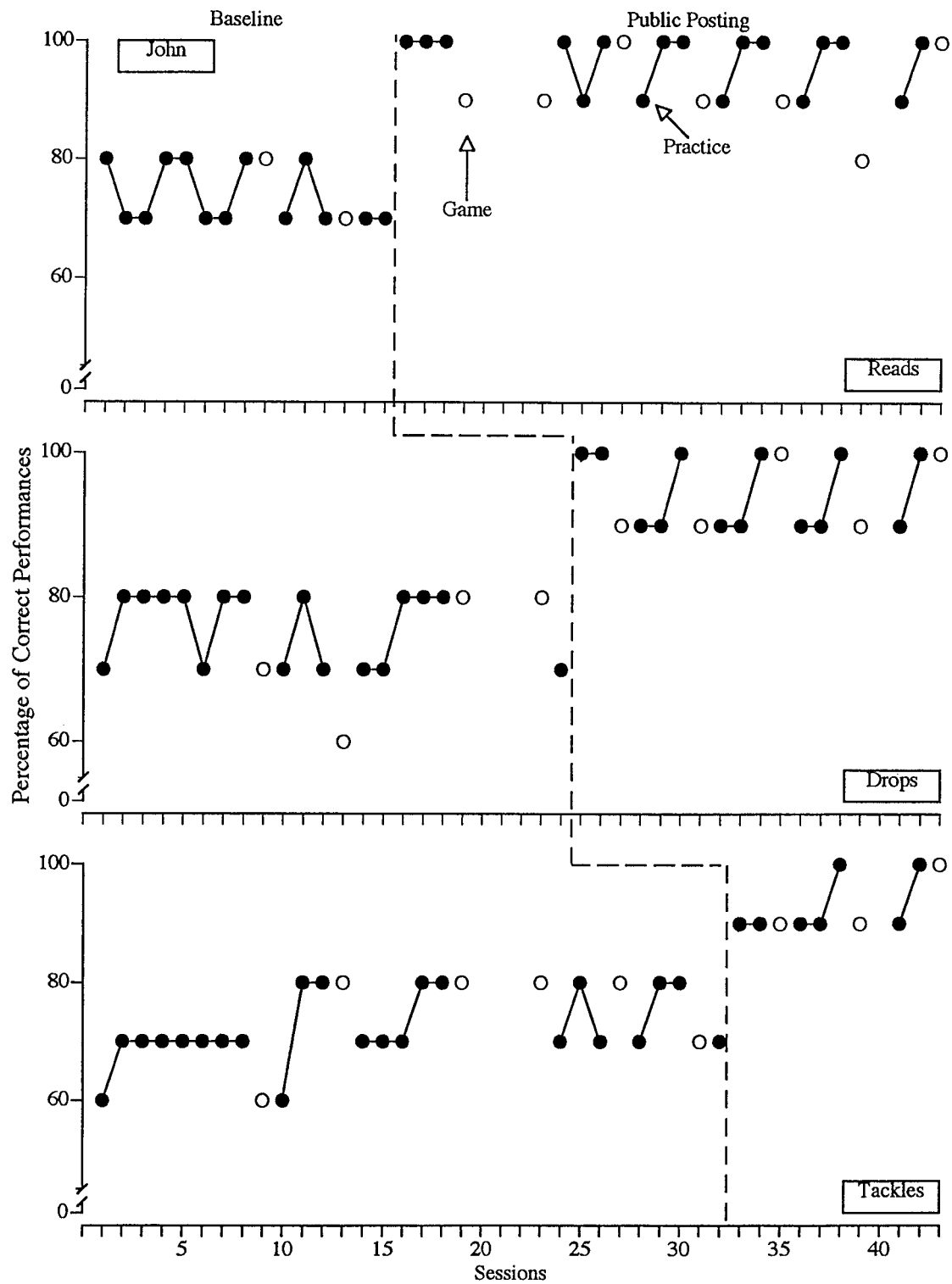


Figure 1. The percentage of reads, drops, and tackles during practice and game sessions for John.

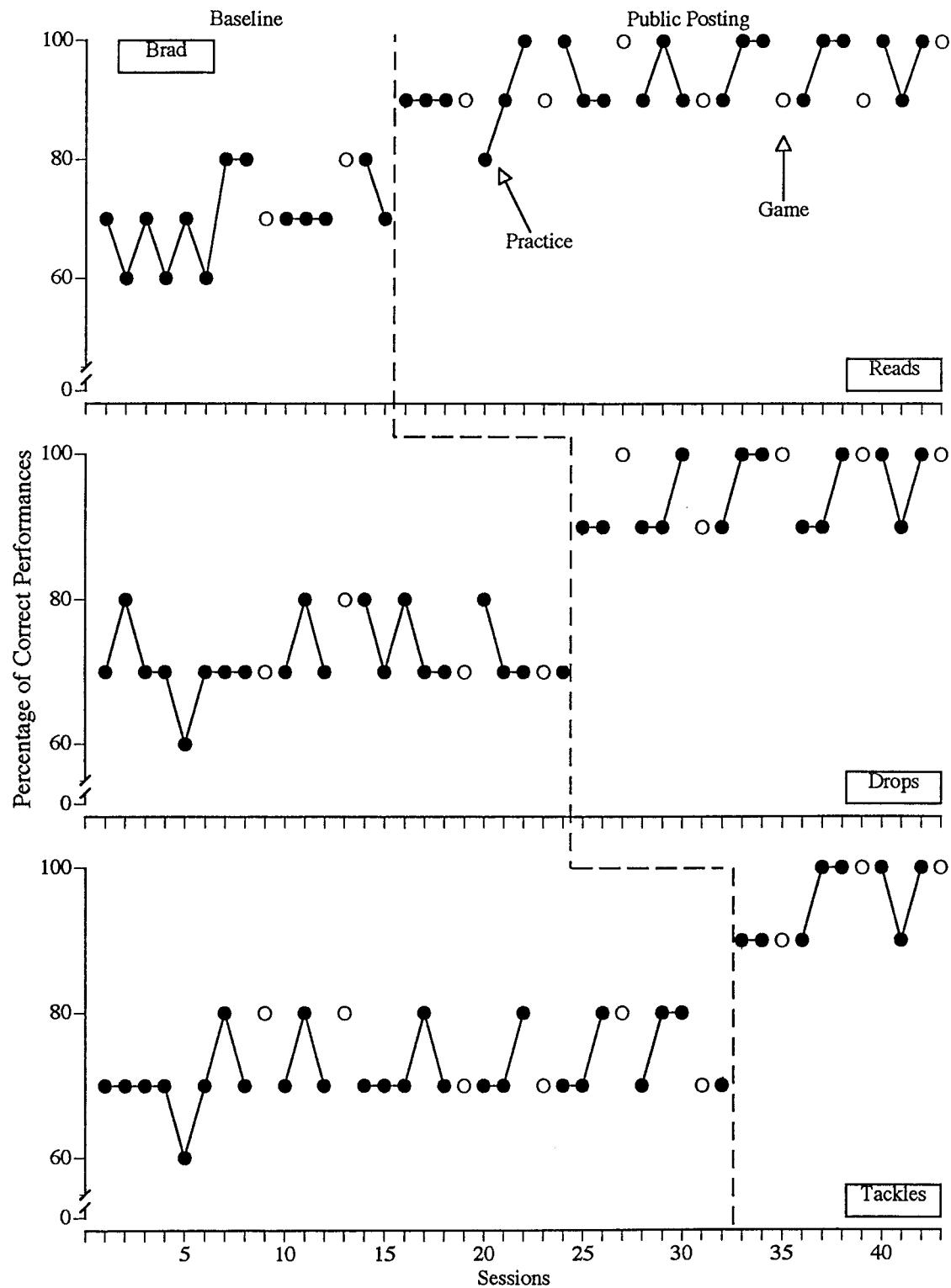


Figure 2. The percentage of reads, drops, and tackles during practice and game sessions for Brad.

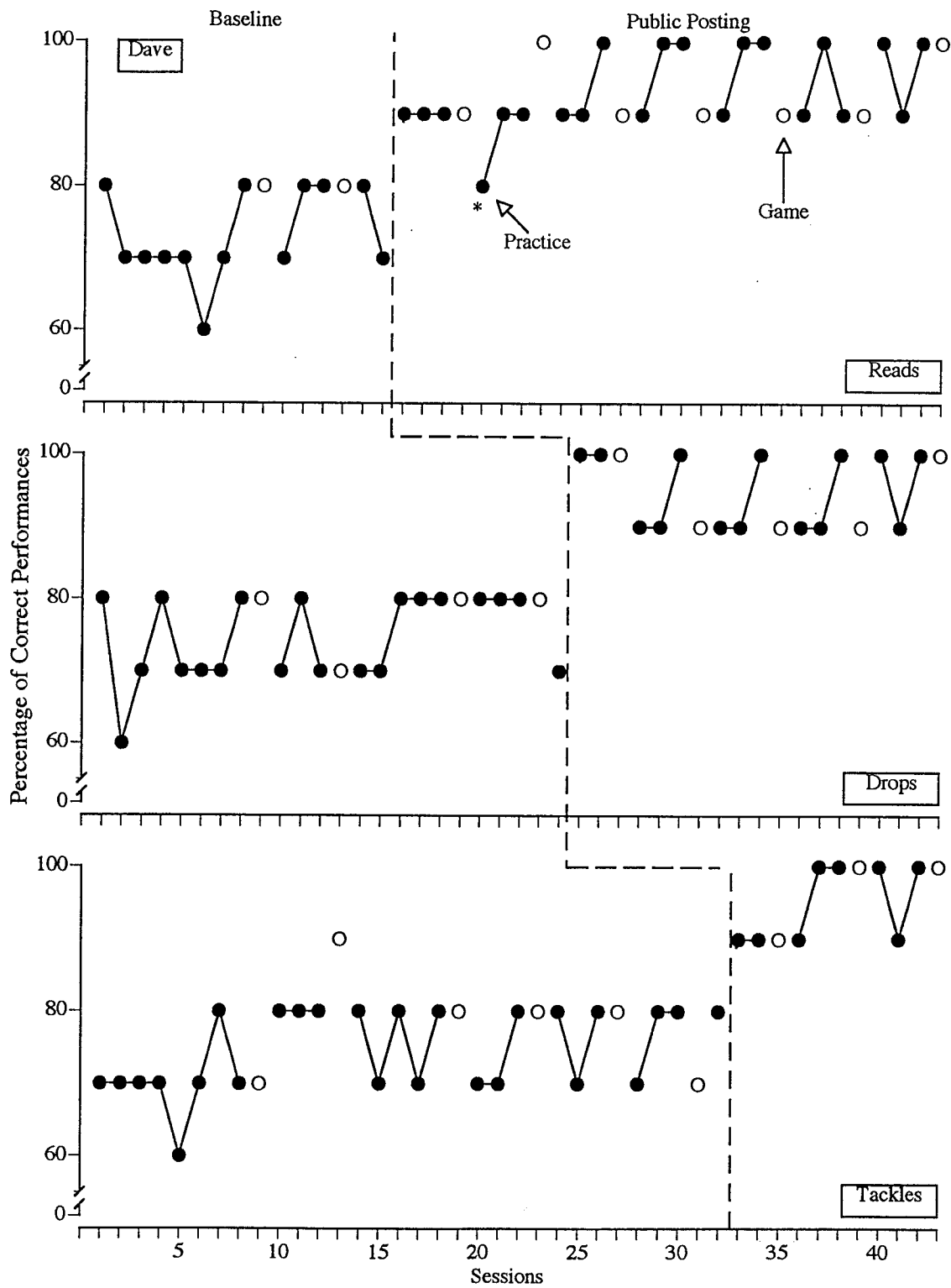


Figure 3. The percentage of reads, drops, and tackles during practice and game sessions for Dave. Days on which the goal was not met are marked by an asterisk.

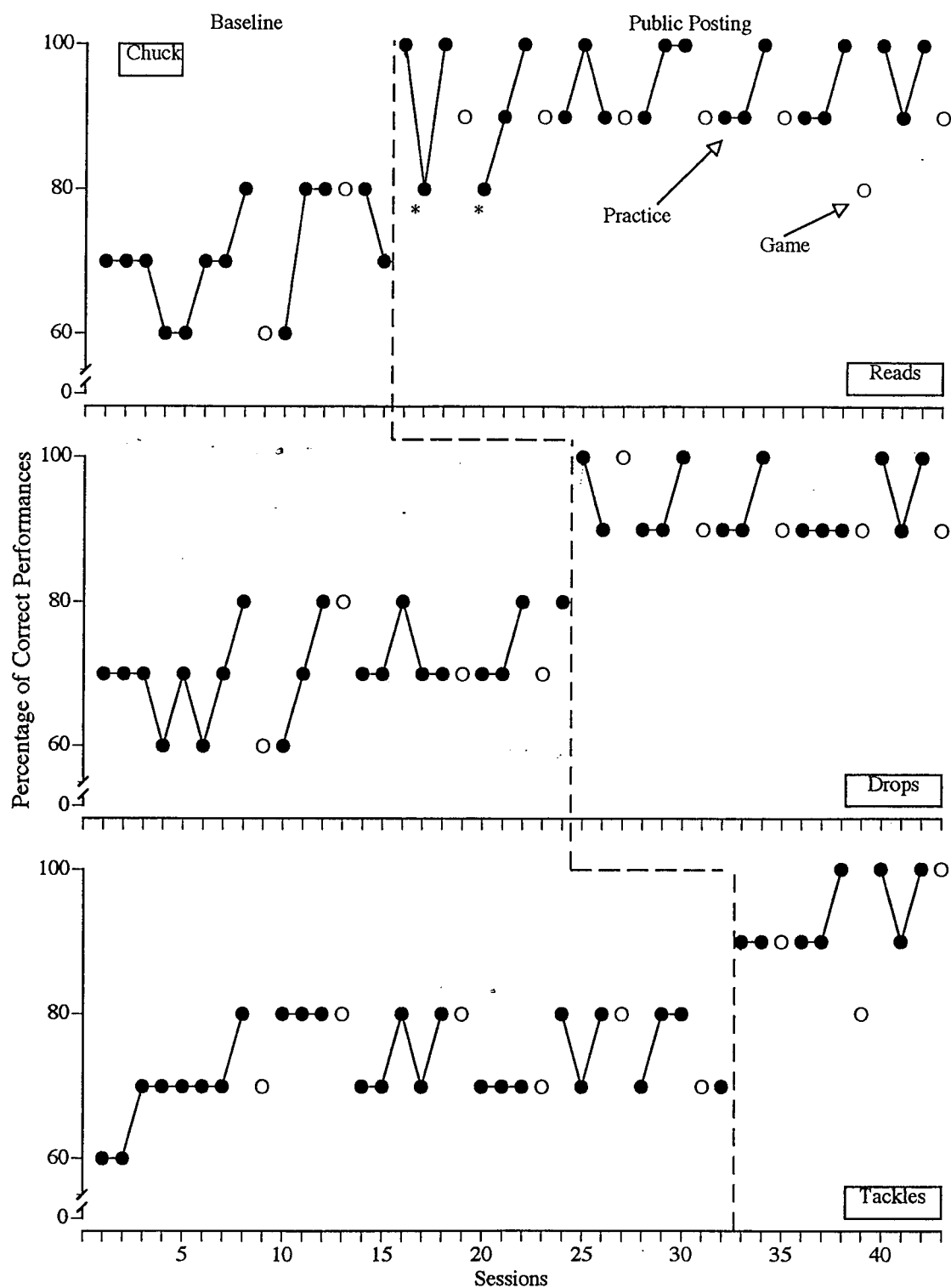


Figure 4. The percentage of reads, drops, and tackles during practice and game sessions for Chuck. Days on which the goal was not met are marked by an asterisk.

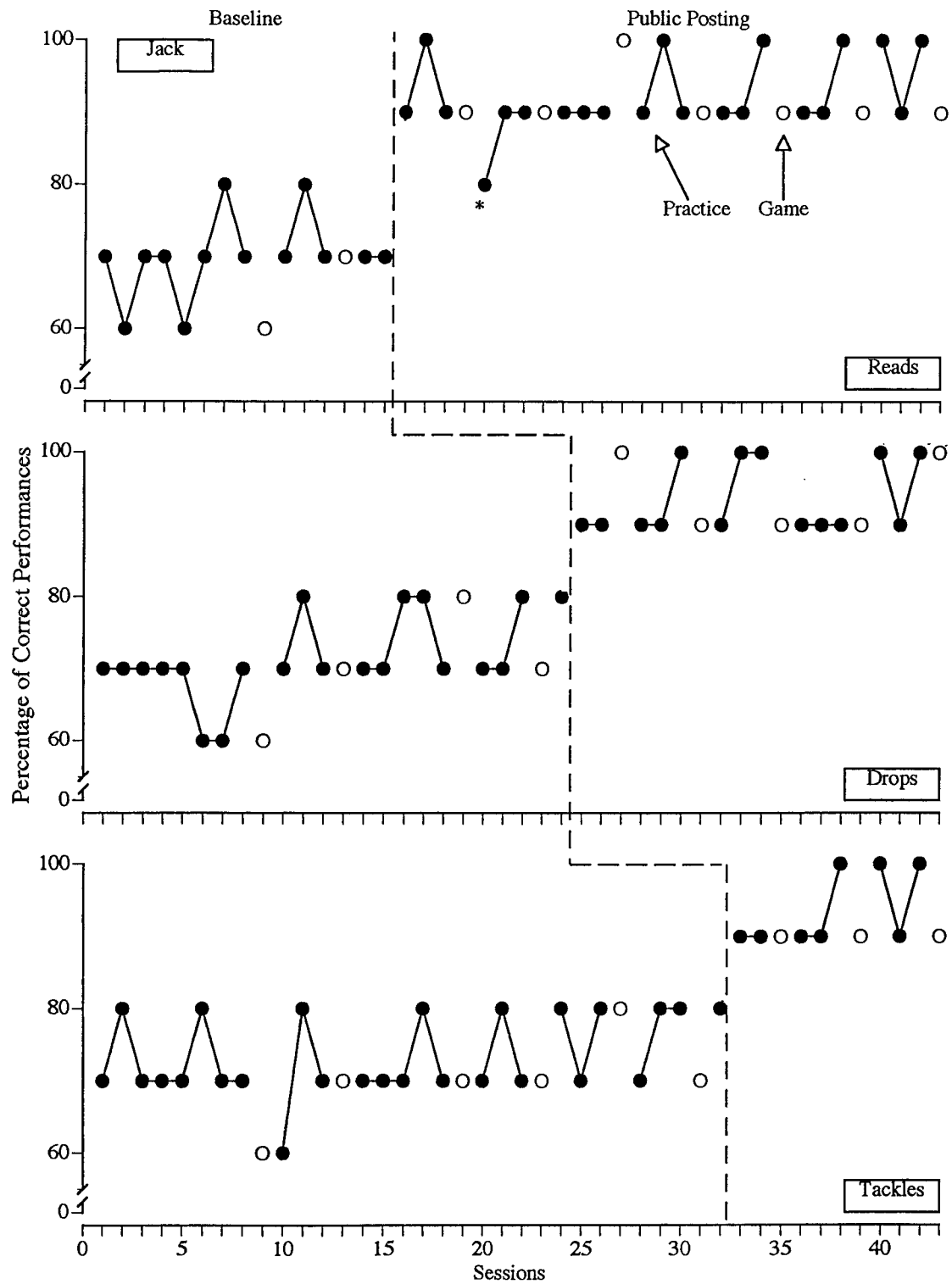


Figure 5. The percentage of reads, drops, and tackles during practice and game sessions for Jack. Days on which the goal was not met are marked by an asterisk.

ond, this study, like most investigations of public posting in sports, occurred at the collegiate level. Thus, it is unknown if similar effects would be obtained with participants in youth or professional sports.

In addition, there are several limitations to this investigation. We did not specifically control for coach feedback. During the experimental condition, changes in coach feedback may have had an effect on player performance. Another limitation of this study is that we limited our data collection to the first 10 trials in practices and games. By using this observation protocol, our measures of skill performance did not sample what occurred during all practices and games. Finally, the two primary data collectors were experienced coaches who were part of the team but were not coaching the linebackers. Although every effort was made to ensure that the observers did not have contact with the players and performance chart, it is possible that they may have observed which behavior had been targeted because of the public nature of the intervention.

Although we demonstrated that skill improvement in practice leads to skill improvement in games, we collected no data to suggest that this improvement in performance translates into improved wins for the team. In one sense, the ultimate validity of sports performance is absent (i.e., winning). However, we do not want to minimize the importance of improving player performance. The performance of players on skills such as those assessed in this study are commonly used to determine starters, team membership, and scholarships on college teams. Moreover, improving player performance is a legitimate coaching outcome for youth sports.

There are several features of public posting interventions that require further investigation. More studies are needed with less skilled athletes, both team and individual activities, and in youth and collegiate athletic

settings. The role of consequences in these interventions needs to be experimentally investigated. At present there is an incomplete explanation for the effectiveness of this technology. At least part of the explanation may lie with an assessment of the individual effects of the components of the intervention. We also recommend that future studies continue to examine the difference between publicly reporting the actual performance level and simply reporting whether a player's goals were met. Finally, future studies should investigate interventions delivered by the coach rather than the researcher.

In conclusion, our results indicate that public posting was an effective technique to increase the correct performance of reads, drops, and tackles by 5 collegiate football players. In addition, the effects of the intervention generalized to game settings. Based on this and previous studies, public posting is an effective, easily used coaching strategy that provides an alternative to punitive methods (e.g., threatening, cajoling, or ridiculing).

REFERENCES

- Bryan, A. J. (1987). Single subject designs for evaluation of sport psychology interventions. *The Sport Psychologist*, 1, 283-292.
- Critchfield, T. S., & Vargas, E. A. (1991). Self-recording, instructions, and public self-graphing: Effects on swimming in the absence of coach verbal interaction. *Behavior Modification*, 15, 95-112.
- Donahue, J. A., Gillis, J. H., & King, K. (1980). Behavior modification in sport and physical education. *Journal of Sports Psychology*, 2, 311-328.
- Galvan, Z. J., & Ward, P. (1998). Effects of public posting on inappropriate on-court behaviors by collegiate tennis players. *The Sport Psychologist*, 12, 419-426.
- Greenspan, M. J., & Feltz, D. L. (1989). Psychological interventions with athletes in competitive situations: A review. *The Sport Psychologist*, 3, 219-236.
- Hume, K. M., Martin, G. M., Gonzalez, P., Cracken, C., & Genthon, S. (1985). A self-monitoring feedback package for improving freestyle figure

- skating practice. *Journal of Sports Psychology*, 7, 333–345.
- Lee, C. (1993). Operant strategies in sport and exercise: Possibilities for theoretical development. *International Journal of Sports Psychology*, 24, 306–325.
- Locke, E. A., & Latham, G. P. (1985). The application of goal setting to sports. *Journal of Sports Psychology*, 1, 205–222.
- Martin, G. L. (1992). Applied behavior analysis in sport and physical education: Past, present, and future. In R. P. West & L. A. Hamerlynk (Eds.), *Designs for excellence in education: The legacy of B. F. Skinner* (pp. 223–257). Longmont, CO: Sopris West.
- McKenzie, T. L., & Rushall, B. S. (1974). Effects of self-recording on attendance and performance in a competitive swimming training environment. *Journal of Applied Behavior Analysis*, 7, 199–206.
- Nordstrom, R., Lorenzi, P., & Hall, R. V. (1991). A review of public posting of performance feedback in work settings. *Journal of Organizational Behavior Management*, 11, 101–121.
- Shambrook, C. J., & Bull, S. J. (1996). The use of single-case research design to investigate the efficacy of imagery training. *Journal of Applied Sport Psychology*, 8, 27–43.
- Siedentop, D. (1980). The management of practice behavior. In W. F. Straub (Ed.), *Sport psychology: An analysis of the athlete* (pp. 49–55). Ithaca, NY: Movement Publications.
- Swain, A., & Jones, G. (1995). Effects of goal-setting interventions on selected basketball skills: A single subject design. *Research Quarterly for Exercise and Sport*, 66, 51–63.
- Van Houten, R. (1980). *Learning through feedback: A systematic approach for improving academic performance*. New York: Human Sciences Press.
- Ward, P., Johnson, L. A., Ward, M. C., & Jones, D. L. (1997). Comparison of the effects of formal and informal accountability on the task accomplishment of a lifeguard rescue. *Journal of Behavioral Education*, 7, 359–371.
- Ward, P., Smith, S., & Sharpe, T. (1997). The effects of accountability on task accomplishment in collegiate football. *Journal of Teaching in Physical Education*, 17, 40–51.
- Weinberg, R. S., Burton, D., Yukelson, D., & Weigand, D. (2000). Perceived goal setting practices of Olympic athletes: An exploratory investigation. *The Sport Psychologist*, 14, 279–295.

Received January 15, 2001

Final acceptance October 19, 2001

Action Editor, Craig Kennedy

STUDY QUESTIONS

1. What were the dependent variables, and how were they measured?
2. Why did the authors limit the number of skill trials to 10?
3. Briefly describe the intervention.
4. The authors described one way in which they assessed generalization; their experimental arrangement allowed assessment of an additional type of generalization. What were these two dimensions of generalization?
5. Summarize the results with respect to performance during both practice and games.
6. What factors other than the independent variable may have influenced the results?

7. Assuming that feedback from the posted data was solely responsible for observed behavior changes, speculate on the operant function that feedback served.
8. Had the authors observed poor performance at games following intervention, what procedures could they have implemented to improve performance?

Questions prepared by Claudia Dozier and Pamela Neidert, The University of Florida